second plane different from the first plane, the first and the second electrode each comprising a planar electrode and said electrodes being in a substantially parallel alignment; and

a gap between the first and the second electrode, the gap being capable of containing a polarizable liquid medium in which a plurality of particles may be suspended, wherein the first and the second electrodes are configured so that when a voltage is applied between the electrodes, with the polarizable liquid medium located in said gap, an electric field is generated at an interface between the second electrode and the polarizable liquid medium, and wherein the second electrode comprises either

(a) a planar light-sensitive electrode, wherein the apparatus controls the movement of the particles or the liquid medium at the interface when the electric field is generated at the interface and the interface is illuminated with a predetermined light pattern

or

(b) a planar electrode having a surface and an interior, said surface or interior having been patterned to modify the properties of the second electrode affecting the local distribution of the electric field at the interface, wherein the apparatus controls the movement of the particles or the liquid medium at the interface when the electric field is generated at said interface.

19. (New) The apparatus of claim 18, wherein the second electrode comprises a silicon electrode.

20. (New) The apparatus of claim 18, further comprising a polarizable liquid medium located in said gap.

21. (New) The apparatus of claim 20, wherein the polarizable medium comprises an

electrolyte solution.

21
22. (New) The apparatus of claim 20, further comprising a plurality of particles located in said gap, wherein said particles are suspended in the liquid medium.

22
23. (New) The apparatus of claim 18, wherein the second electrode comprises the light-sensitive electrode and wherein the apparatus controls the movement of the particles or the liquid medium at the interface when the electric field is generated at the interface and the interface is illuminated with the predetermined light pattern.

23
24. (New) The apparatus of claim 23, wherein the light-sensitive electrode is patterned by spatially modulated oxide growth, surface chemical patterning or surface profiling, wherein said patterning produces spatial modulation in properties of the second electrode, said properties affecting the local distribution of the electric field at said interface.

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24
25. (New) The apparatus of claim 24, wherein the modified properties comprises impedance.

25
26. (New) The apparatus of claim 23, further comprising an electric field generator which generates the electric field at the interface and an illumination source for illuminating the interface.

26
27. (New) The apparatus of claim 18, wherein the second electrode comprises the planar patterned electrode and wherein the apparatus controls the movement of the particles or the liquid medium at the interface when the electric field is generated at said interface.

27
28. (New) The apparatus of claim 27, wherein the second electrode comprises a silicon electrode.

28
29. (New) The apparatus of claim 27, wherein the surface or interior of the second electrode is patterned by spatially modulated oxide growth, surface chemical patterning or surface profiling, wherein said patterning produces spatial modulation in properties of the second electrode, said properties affecting the local distribution of the electric field at said interface.

29
30. (New) The apparatus of claim 27, wherein the modified properties comprises impedance.

30
31. (New) The apparatus of claim 27, further comprising an electric field generator for generating the electric field at the interface.

31
32. (New) A method for controlling the movement of a polarizable liquid medium comprising the following steps:

providing the apparatus of claim 23, wherein the gap between the first electrode and the light-sensitive electrode contains a polarizable liquid medium;

generating an electric field at the interface between the liquid medium and the light-sensitive electrode; and

illuminating the light sensitive electrode with a predetermined light pattern to create fluid flow having a direction substantially parallel to said light-sensitive electrode.

32
33. (New) A method for controlling the movement of a polarizable liquid medium comprising the following steps:

providing the apparatus of claim 23, wherein the gap between the first electrode and the patterned electrode contains a polarizable liquid medium; and

generating an electric field at the interface to create fluid flow, said fluid flow having a direction substantially parallel to said patterned electrode.

33

~~34.~~ (New) A method for controlling the movement of particles suspended at an interface between a polarizable liquid medium and an electrode, said method comprising the following steps:

providing the apparatus of claim 23, wherein the gap between the first electrode and the light-sensitive electrode contains a plurality of particles suspended in a polarizable liquid medium;

generating an electric field at the interface between the liquid medium and the light-sensitive electrode; and

illuminating the light sensitive electrode with a predetermined light pattern to produce the movement of the particles.

34

~~35.~~ (New) The method of claim 34, wherein the movement of the particles is in a direction substantially parallel to said light-sensitive electrode.

35

~~36.~~ (New) The method of claim 34, wherein the movement of the particles is in a direction substantially orthogonal to the direction of the electric field.

36

~~37.~~ (New) The method of claim 34, wherein the movement of the particles results in formation of a planar assembly of substantially one layer of particles in a designated area of the light-sensitive electrode, wherein the designated area is defined by the pattern of illumination.

37

~~38.~~ (New) The method of claim 37, wherein the assembly comprises an array of particles.

38
39. (New) The method of claim 34, wherein the light-sensitive electrode comprises a silicon electrode.

39
40. (New) The method of claim 34, wherein the polarizable liquid medium comprises an electrolyte solution.

40
41. (New) The method of claim 34, wherein the light-sensitive electrode is patterned by spatially modulated oxide growth, surface chemical patterning or surface profiling, wherein said patterning produces spatial modulation in properties of the second electrode, said properties affecting the local distribution of the electric field at said interface.

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42. (New) The method of claim 41, wherein the modified properties comprises impedance.

42
43. (New) A method for controlling the movement of particles suspended at an interface between a polarizable liquid medium and an electrode, said method comprising the following steps:

providing the apparatus of claim 27, wherein the gap between the first electrode and the patterned electrode contains a plurality of particles suspended in a polarizable liquid medium; and

generating an electric field at the interface to produce the movement of the particles.

43
44. (New) The method of claim 43, wherein the movement of the particles is in a direction substantially parallel to said patterned electrode.

44
45. (New) The method of claim 43, wherein the movement of the particles is in a direction

substantially orthogonal to the direction of the electric field.

45

46. (New) The method of claim 43, wherein the movement of the particles results in formation of a planar assembly of substantially one layer of particles in a designated area of the patterned electrode, wherein the designated area is defined by the properties of the patterned electrode affecting the local distribution of the electric field at the interface.

46

47. (New) The method of claim 43, wherein the assembly comprises an array of particles.

47

48. (New) The method of claim 43, wherein the patterned electrode comprises a silicon electrode.

48

49. (New) The method of claim 43, wherein the polarizable medium comprises an electrolyte solution.

49

50. (New) The method of claim 43, wherein the patterned electrode is patterned by spatially modulated oxide growth, surface chemical patterning or surface profiling.

50

51. (New) The method of claim 50, wherein the modified properties comprises impedance.